

air between the charcoal terminations of the poles of a powerful battery, when they are gradually separated after contact. Then the passage is through heated air exactly as with common electricity, and Sir H. Davy has recorded that with the original battery of the Royal Institution this discharge passed through a space of at least four inches.¹ In the exhausted receiver the electricity would *strike* through nearly half an inch of space, and the combined effects of rarefaction and heat was such upon the inclosed air as to enable it to conduct the electricity through a space of six or seven inches.

11. The instantaneous charge of a Leyden battery by the poles of a voltaic apparatus is another proof of the tension, and also the quantity, of electricity evolved by the latter. Sir II. Davy says,² "When the two conductors from the ends of the combination were connected with a Leyden battery, one with the internal, the other with the external coating, the battery instantly became charged; and on removing the wires and making the proper connections, either a shock or a *spark* could be perceived: and the least possible time of contact was sufficient to renew the charge to its full intensity."

12. *In motion* : i. *Evolution of heat*.—The evolution of heat in wires and fluids by the voltaic current is matter of general notoriety.

13. ii. *Magnetism*.—No fact is better known to philosophers than the power of the voltaic current to deflect the magnetir needle, and to make magnets according to *certain laws*; and no effect can be more distinctive of an electrical current.

14. iii. *Chemical decomposition*.—The chemical powers of the voltaic current, and their subjection to *certain laws*, are also perfectly well known.

15. iv. *Physiological effects*.—The power of the voltaic current, when strong, to shock and convulse the whole animal system, and when weak to affect the tongue and the eyes, is very characteristic, jj

16. v. *Spark*.—The brilliant star of light produced by the discharge of a voltaic battery is known to all as the most beautiful light that man can produce by art.

17. That these effects may be almost infinitely varied, some being exalted whilst others are diminished, is universally acknowledged.

known; and yet without any doubt of
the identity of
character of the voltaic currents thus made to
differ in their

¹ *Elements of Chemical Philosophy.*

² *Hii*